Germantown - A proposal for a New Corridor City

by

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In partial fulfillment of the requirements
for the degree of

MASTER OF ARCHITECTURE

Massachusetts Institute of Technology

June 1967

Lawrence B. Anderson
Dean, School of Architecture and Planning
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dear Dean Anderson:

In partial fulfillment of the requirements for the degree of Master of Architecture I hereby submit a thesis entitled "Germantown--A Proposal for a New Corridor City."

Respectfully,

Stanley Leonard Anderson

June, 1967

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ACKNOWLEDGEMENTS

I wish to express my appreciation to Jan Lubicz-Nycz for his helpful criticism and encouragement in the completion of this project.

I. ABSTRACT

Germantown-A Proposal for a New Corridor City

Stanley Leonard Anderson

Submitted to the Department of Architecture on June 19, 1967 in partial fulfillment of the requirements for the degree of Master of Architecture.

The object of this thesis is to develop a prototype for a corridor city as proposed in the "Wedges and Corridors" General Plan, adapted by the Maryland-National Capital Park and Planning Commission in 1964 to serve the burgeoning population of the Washington, D.C. metropolitan area. The city is intended to provide the necessary facilities for an eventual population of 100,000 by the Year 2000.

Thesis Supervisor: Jan Lubicz-Nycz

II. BACKGROUND

Location

The site which has been selected for this proposed new city is near the present town of Germantown in Montgomery County, Maryland, located about 25 miles northwest of downtown Washington, D.C. at the intersection of Maryland Route 118 and the Metropolitan Branch of the Baltimore and Ohio Railroad. It is also some 33 miles to Baltimore, 18 miles to Frederick and 9 miles to Rockville, the County Seat.

Population

Montgomery County is one of the fastest growing suburban aresa in the United States. In the years from 1910-1960 it experienced a growth rate of over 1000 percent, and from 1940 on, the population has doubled every ten years. The population in 1960 stood at 340,928 persons.

Present Land Usage

The present village of Germantown consists of a small concentration of both old and new dwellings plus other facilities such as: a general store, bank, nursing home, grain mill, and an elementary school. Other small, well established communities in the planning area are Middlebrook, some 3 miles to the north at the intersection of Maryland Route 355 and Middlebrook Road; and Neelsville, about one north of Middlebrook on Route 355.

Employment centers of importance are the National Headquarters of the Atomic Energy Commission located at the southwest quadrant of the Route 118 Interchange with 70S and the Fairchild Hiller industrial research center, now under construction, to the north across Route 118.

Except for occasional commercial uses, the remainder of the land in the planning area is lying idle or used for agricultural, private recreational or State Park purposes. The Little Seneca Regional Park lies directly north of the planning area and the Great Seneca State Park lies directly to the south.

Natural Features

The Germantown planning area lies within the Piedmont Plateau a region extending from the Hudson River to East Central Alabama. It is characterized by a rolling to hilly topography which, in the planning area, ranges in elevation from 300 to 500 feet above sea level. Rock outcroppings are evident and a number of minor drainage channels cross the area, many of which contain spring fed streams.

Soils in the area are considered to be only moderately good for farming. These soils are not highly productive but are used for all common crops and for pasture. Woods are prevalent throughout the planning area.

Germantown enjoys a favorable climate with extremes in temperature seldom experienced. According to records kept at Rockville, the County Seat, average January temperature is 33.0 degrees and average June temperature is 74.2 degrees. Mean annual precipitation is about 40 inches, distributed uniformly throughout the year, largely in the form of rain, although heavy snowfalls have been recorded on occasion.

Normal movement of air currents flowing from the southwest or northwest across the Appalachian Mountains, keeps the Germantown area relatively free of the air pollution which affects the Washington Metropolitan region. This factor, along with an increase in elevation of approximately 400 feet over downtown Washington, D.C., keeps the planning area somewhat cooler in the summer.

III. PROJECTIONS

Population Growth

As stated previously, the region under consideration is one of the fastest growing in this country. With the coming of World War II and the expansion of federal government, the growing population of the Washington area has spread out in all directions. By 1960, 35 per cent of the metropolitan area had settled in the two adjoining Maryland counties of Montgomery and Prince Georges.

While statistics show that the rate of growth is slowing down, the growth in total numbers is still very substantial and will continue to be through 1970. By 1980, the Regional District will be host to a population of about 1,435,000, and by the year 2000, the bi-county figure will reach nearly 2,190,000, almost as much as the present Washington Metropolitan Area population of approximately 2,400,000.

All population growth in the future will not be expected to take place in the corridor cities, however. About 53 per cent of the growth in the next 20 years will take place in the ring of already urbanized land surrounding the District of Columbia. Another 40 per cent of this growth will occur in the corridor cities, while perhaps 3 per cent will be in the large-lot fringe along the edges of the corridors, and the remaining 4 per cent will be in rural or semi-rural villages.

In the period between 1980 and 2000, new growth will be located to a much greater extent in the new corridor cities, some of which will begin to approach their maximum population ranges of 75,000 to 125,000. However, the corridors will not develop overnight and even by the Year 2000 all the space provided in the recommended urban pattern will not be used to its fullest capacity.

Judging from past trends in the Regional District, Germantown will be largely populated by families with incomes well above the national average and possessing a high level of education. These characteristics will be reflected in the kinds of dwellings, community facilities, and leisuretime activities which will be needed to serve local residents. There will also be a need for living accommodations for s service employees with low and medium incomes who will be unable to find a home in a housing market geared to a high income population. For this group there should be a determined effort to augment physical-design proposals with federal aid programs.

There are several indications that the Germantown area can expect to attract at least its share of this projected corridor city growth for it possesses many of the qualities which draw potential residential development such as: convenient access to highway and rail facilities, all utility

requirements readily at hand, recreational facilities immediately available, and pleasant terrain. The highway access deserves special mention. Highway 70S, a major northerly radial road from Washington, passes directly through the area providing an expressway connection to the city center. This will be further augmented by the eventual use of Route 118 as a part of the major circumferential highway around the District of Columbia.

Employment Characteristics

The Washington area has consistently had one of the lowest unemployment rates in the country. This is partially due to the unusual nature of the economic base of the area with almost one-third of the work force being employed by the various levels of government while manufacturing only accounting for about 6 per cent. Industrial employment is expected to increase substantially as research and development firms begin to find Washington as well suited to their operation. Neither can it be anticipated that the number of persons employed by the government will fail to increase during these years.

But Germantown will act as more than a bedroom community to Washington. By the Year 2000 a total of 50,000 jobs are expected in the Germantown area itself. Some of the major employers will be the National Atomic Energy Commission

(2500 employees), the National Bureau of Standards (5000-7000 employees), and Fairchild Inc. (500-700 employees). In addition it is estimated that there will be approximately 10,000 non-basic or service jobs in the area. It can be assumed that a considerable portion of the 30,000 jobs will be carried out by people outside of the Germantown area, commuting to and from work. It is also expected that the residents of the town will to a significant degree commute to jobs outside of the community.

The following assumptions for the expected growth of Germantown by immigration and natural growth have been made to cover the years until 2000.

Year	Population	Dwellings	Jobs
1965	--	--	--
1970	15,000	4,300	5,000
1975	30,000	8,600	10,000
1980	45,000	12,900	15,000
1985	60,000	17,200	20,000
1990	75,000	23,800	20,000
1995	87,500	28,000	27,000
2000	100,000	32,000	30,000

IV. PROPOSAL

Selection of Site

With the Germantown area having been selected as the site of the proposed new town, it remained for the location of the nucleus of this new development to be determined. After evaluation of the various criteria which were necessary for the efficient functioning of such a large concentration of people, I finally selected the area directly southwest of the present village of Germantown as my choice for its placement. This area, bounded onthe northwest by by Route 118, on the northeast by Clopper Road, and on the southwest by Riffle Ford Road, fulfilled the necessary access, utility and facility requirements.

The area has direct access from Route 118, the circumferential highway around Washington, which in turn feeds into Route 70S, a major radial highway from Washington, at about one mile from the site. Clopper Road at present runs from Route 118 connecting to 70S just north of Gaithersburg thus giving two feeder roads from the area to this major trunk road. The preliminary Master Plan for Germantown envisions the enlargement of Clopper Road into a major highway as well as expansion of another parallel highway which approximates the location of the present Riffle Ford Road (see Land Use Plan in the Planning Commission Report).

For a link with a newly developed rapid transit route from Washington, I assumed the use of the existing B&O Railroad right-of-way from Washington to a point just north of Gaithersburg where it would join the enlarged Clopper Road right-of-way to connect it to the site. From the new Germantown it would then follow existing road networks to Clarksburg, the proposed site of the next corridor city development.

This particular site also has direct access to major utilities. An existing gravity trunk sewer runs immediately to the south and downhill from the site and is of sufficient capacity to provide service for the enlarged Germantown. Electric power is also readily available from a power line running through the wooded area south of the planned location. Water supply is accomplished by means of a recently installed 24 inch line wich runs north along Route 335 to Route 27 and from there along Route 118.

Flanking the southern boundary of the site which I have chosen is the Great Seneca State Park. This provides easily accessible recreational space and at the same time is protected from later encroachment of city growth by the nature of its state ownership. I propose enhancing the recreational facilities by damming the spring-fed Great Seneca Creek at a point just to the south of Riffle Ford Road to provide an artificial lake.

Program

Spatial and Environmental Requirements--

It is possible to determine certain characteristics of a building's spatial, volumetric, and environmental requirements and classify these into a limited number of categories which can accommodate the needs of most functions. Those things categorized include dimensional restrictions, basic structural demands, and aesthetic and environmental qualities desired in the space. Such a classification enables one to determine more readily the entire mass of the proposed city early in its development and helps to formulate relationships between different uses which can be beneficial in bringing them together to function more efficiently. The seven classifications listed below cover the requirements which most uses demand.

Space-Volume A

Characteristics

Low space--floor to ceiling 10'

Depth not more than 30' from external wall

Access to natural light, air, and view

Small live loads

Space highly fragmented externally and internally

Typical Uses

Dwelling

Hotel Room

Hospital or nursing ward

Space-Volume B

Characteristics

Floor to ceiling 12'-15'

Depth 30'-40' from exterior wall

Natural light, air, and view desirable

High degree of environmental control

Medium span structural systems (30'x30')

High degree of partitional flexibility

Typical Uses

Elementary School

Junior High School

College

Technical Institute

Library

Space-Volume C

Characteristics

Floor to ceiling 12'-15'

Depth--distance from external walls unlimited

Natural light and air not mandatory

High degree of environmental control

Medium span structural system (30'x30')

Heavy live loads

High Degree of flexibility for rearrangement

Typical Uses

Offices

Research Laboratories

Commercial: Supermarket

Department Store

Shops

Restaurants and clubs

Space-Volume D

Characteristics

High space floor to ceiling, more than 30'

Some natural light desirable

Wide span, more than 60', heavy loads

High degree of environmental control

Typical Uses

City Hall

Museum

Art Gallery

Gymnasium

Places of Worship

Space-Volume E

Characteristics

High space, floor to ceiling more than 35'

No contact with external surface required

Wide span, more than 60', heavy live loads

Natural light and air not desirable

High degree of environmental control

Typical Uses

Auditorium

Theater

Cinema

Bowling Alley

Space-Volume F

Characteristics

High space floor to ceiling, 20'

Access to natural light and air not needed

Wide span 60'x60'

Heavy live loads

Some environmental control

Typical Uses

Industry

Warehouse

Mechanical Plants

Parking (floor to ceiling 8')

Bus Terminal

Space-Volume G

Characteristics

Open spaces exposed to elements

Manipulation with grade

Exposed horizontal surfaces of structures

Typical Uses

Parks

Gardens

Patios

Roads

Piazzas

The above classification does not imply rigid adherence to it. It is only meant to serve as a guide in the organization of use-space relationships.

In addition to the above considerations there are many other factors which must be solved satisfactorily in order for the city to operate efficiently. These functional requirements include servicing, circulation, ease of expansion, fire and police protection, maintenance, and adaptability to changing civic needs.

Quantitative Requirements--

For the initial stage of development we have set the target date of 1975 as our goal and therefore need accommodations and facilities for approximately 30,000 people. The following quantitative program for ten years hence can give some indication of the requirements for further development, but it becomes increasingly difficult to foresee what unanticipated problems will be encountered and they must therefore remain merely educated guesses.

Housing (A) volumetric requirement	size	per cent	no.	sq. ft.
Efficiency Units	500	7%	600	300,000
1 BR	750	18%	1550	1,160,000
2 BR	900	25%	2150	1,935,000
3 BR	1100	25%	2150	2,580,000
4 BR	1250	15%	1300	1,525,000
5 BR plus	1450	10%	850	1,230,000
Total sq. ft. for housing				8,850,000
Elementary Schools (4) (B)				176,000
Jr. High Schools (2) (B)				72,0000
Senior High Schools (B)				146,000
Technical Institute (B)				150,000
Regional College (B)				150,000
Museum and Art Gallery (D)				20,000
Library (B)				20,000
Auditorium (E)				40,000
Theater (E)				25,000
Cinemas (3) (E)				10,000
Places of Worship (12) (D)				240,000
Multi-Purpose Halls (5) (D)				100,000
Gymnasiums (3) (D)				45,000
Covered Swimming Pools (2) (D)				20,000
Bowling Alley (E)				10,000
Motel-Hotel (500 rooms) (A)				200,000
Restaurants (C)				40,000
Cafes, Night Clubs (C)				30,000

Local Shops (C)	250,000
Regional Shops (C)	1,000,000
City Hall-Administration (D)	50,000
Police Station - Jail (G)	25,000
Hospital (A)	120,000
Fire Stations (2) (F)	30,000
Post Office (B)	20,000
Medical Centers (A)	24,000
Office Space (C)	750,000
Research and Labs (C)	150,000
Light Industrial and Warehousing (F)	1,000,000
Parking Structures (F)	6,000,000
Total sq. ft.	19,633,000

Additional Facilities

Stadium

Utilities

Transportation Facilities

Parks and Open Space

A total of almost 20,000,000 square feet must then be provided within the next ten years to provide for the expected population. Obviously some structures have a greater priority than others in the construction scheduling, notably housing, schools, basic shops, and rudimentary transportation facilities.

Architectural Proposal

The form which my proposal for Germantown takes is that of a city organized around a linear service spine which runs parallel to, and at a distance of about one mile to the southeast of Route 118. This spine is segmented into sections of approximately one-quarter mile in length which are connected at nodal points. These points become the major organizational centers for the scheme for it is from these nodes that changes in mode, speed, and level occur, that future growth would spring from, and that connection between the housing and commercial portions of the city occurs.

The main service spine contains all the major functions, other than housing, along with the parking and heavy delivery facilities necessary for their operation. The spine is b bounded on either side by the one-way highways which serve to connect the city to the regional road network.

The proposed housing is accommodated in a variety of residential forms from high-rise apartments through terraced row housing and semi-detached dwellings. These residential areas run perpendicular to the main spine to provide for a greater degree of segmental growth. Vehicular access is supplied from the main nodal points under the high-rise extensions from which secondary roads feed the parking platforms.

Pedestrian access from the housing to the central core is provided by a network of walkways and arcades. The high-rise "stems" contain both an open arcade for summer strolling and an interior "street," containing small shops and offices, for year around use.

There are two main activity levels on the main spine, the lower, and primary one, serving the major stores, cultural facilities, and larger offices while the upper serves small offices and speciality shops. The two levels are connected by escalators from the rapid transit stops and by elevators from the parking garages. The upper level is also directly connected to the interior "streets" of the housing branches. Horizontal pedestrian movement on the spine is reinforced by a system of moving sidewalks which connect minor nodal points and operate on the second activity level.

Expansion is designed to take a different form in the housing than in the commercial areas. The housing, where needs for additional space are immediate, is designed to grow in small increments, mainly determined by parking structures. The commercial area, which is much more flexible in accommodating increases in population, is designed to grow in larger segments as demanded by its heavy service requirements. This core is intended to expand linearly parallel to Route 118 to fulfill the needs of a growing city.

As the spine grows each segment of expansion continues to be a self-contained unit of transportation and service facilities which requires no further development for its functioning. Thus the rapid transit and highway system can operate in the same manner for the initial 30,000 population phase as for the completed city of 1000,000. (I use the word''completed' with reservations for this city form is not intended to be one which reaches an optimum size but, rather, one which is flexible enough to continue to grow beyond the projected population figures.) The truck service, feeding as it does from the nodal point, can grow in small increments thus allowing the commercial core to expand at a gradual pace until it completes the total segment. Then the next nodal point is added, completing the transportation network, and the unit is ready for further growth through the development of a new segment.

The following photographs illustrate my conception of the form which I feel such a development might take. The first two show the preliminary model which included a study of the uses anticipated in the city. The segment of the development closest to Route 70S was then chosen to be investigated for possible alternate solutions and the results of this, first the drawings and then the model, are shown in the photographs which follow.

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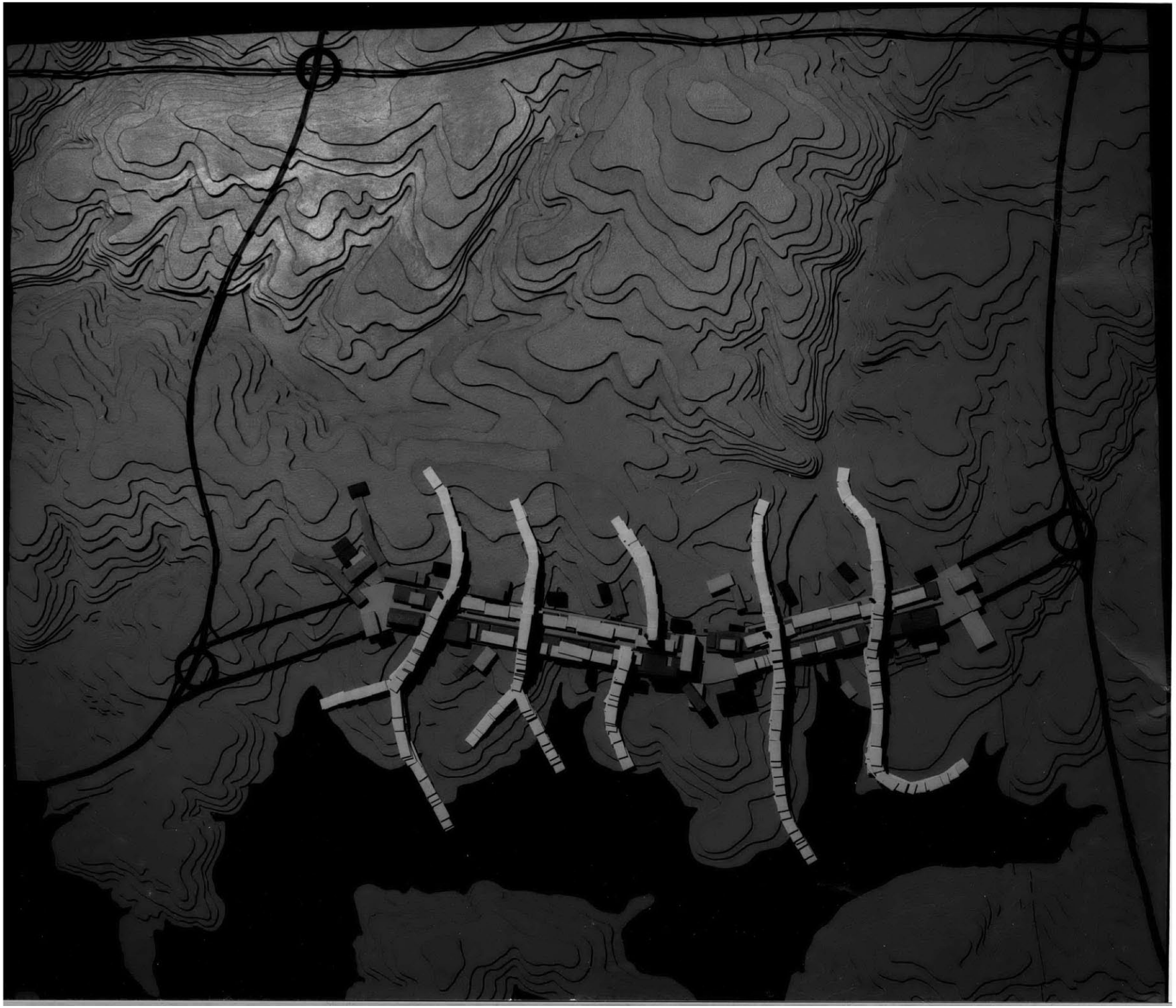
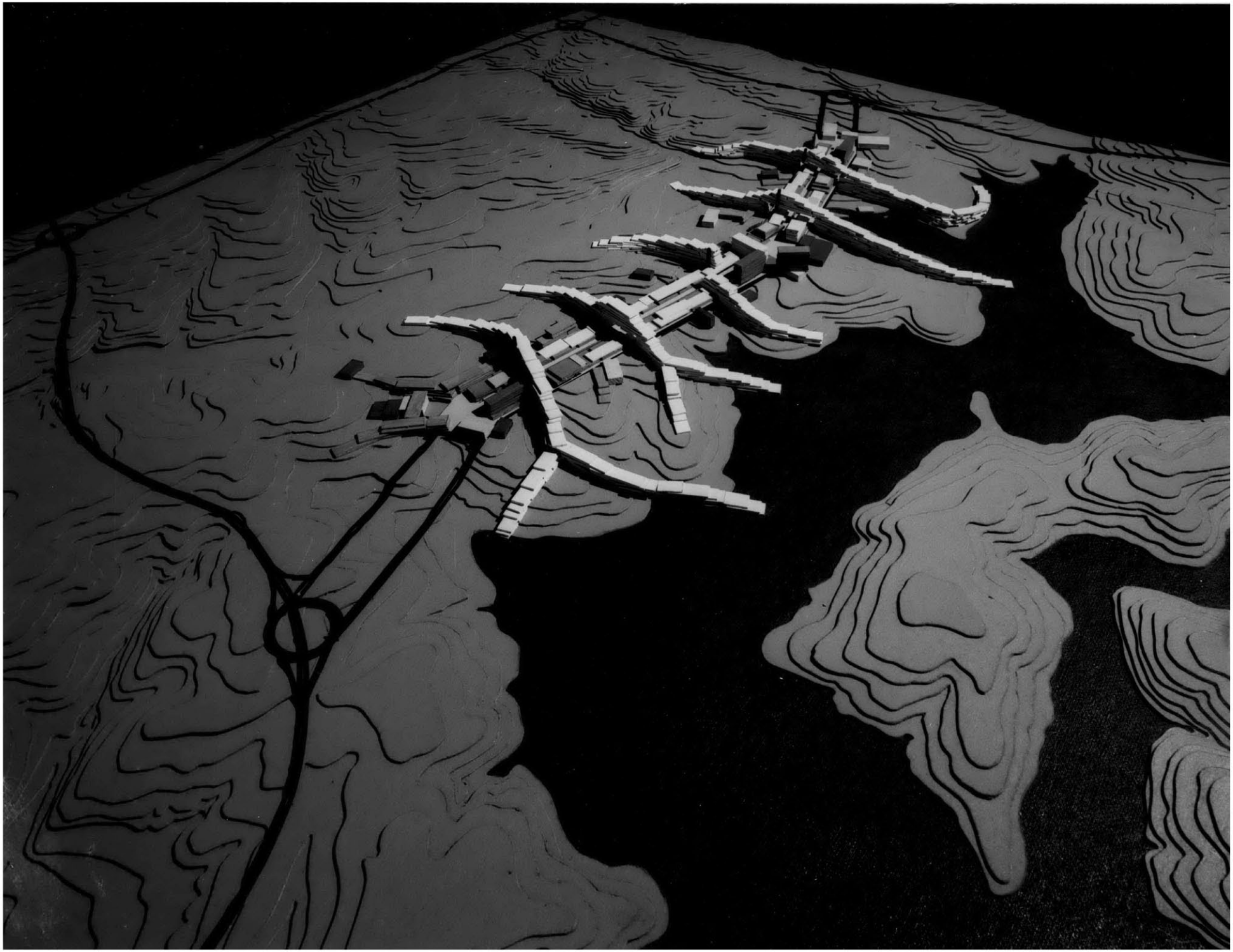
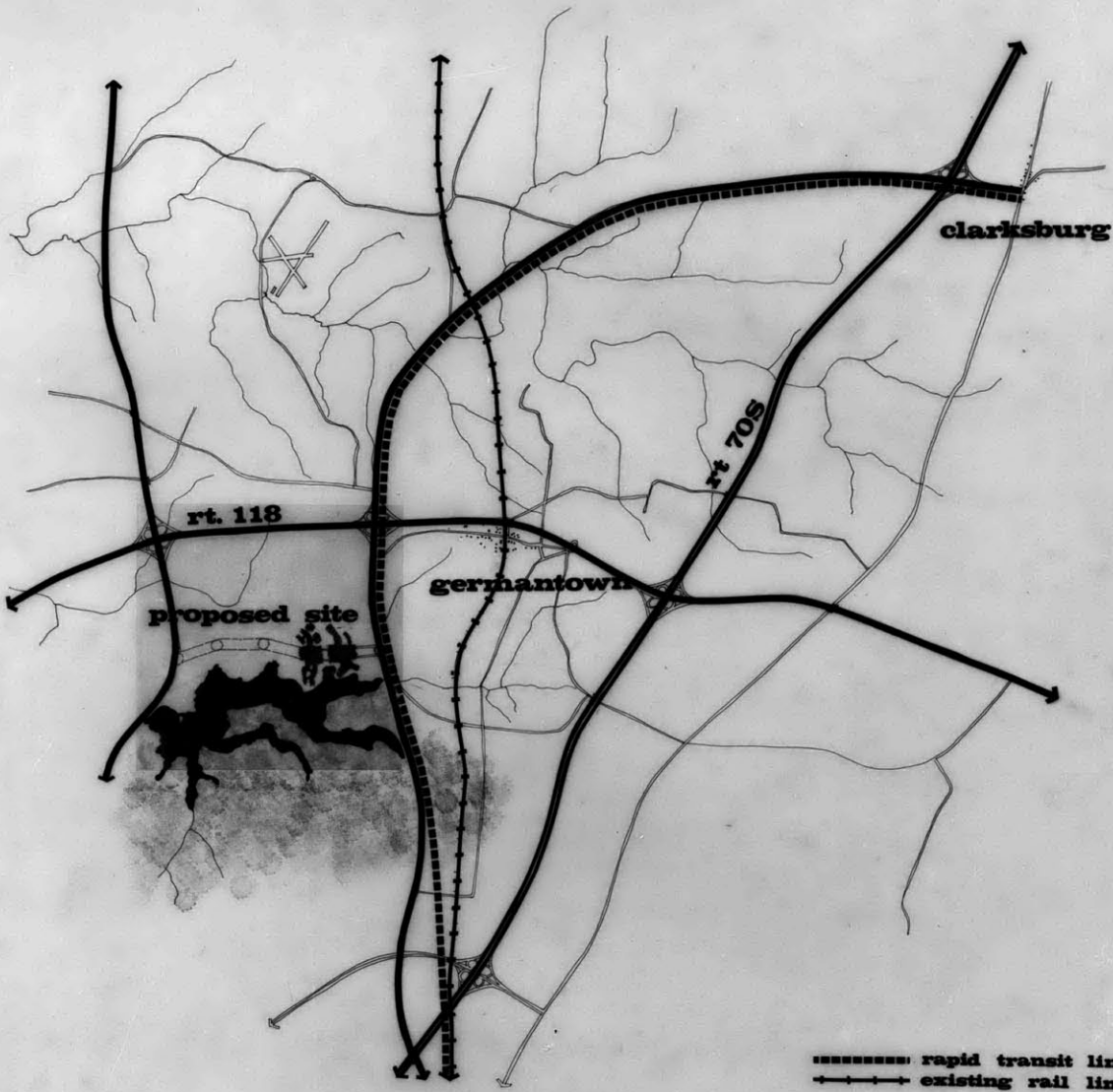


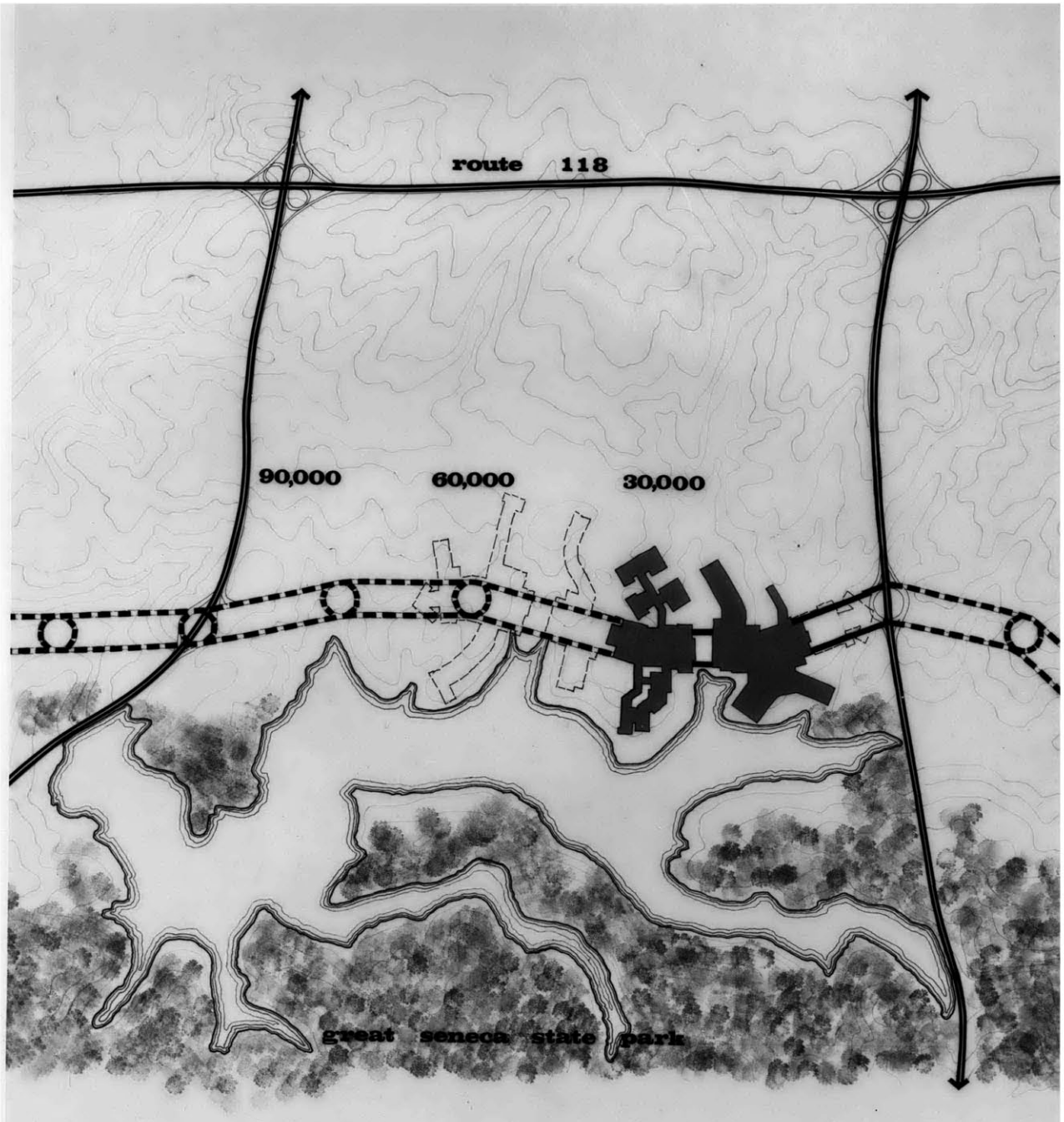




REGIONAL PLAN
scale: 1" - 2000'

N

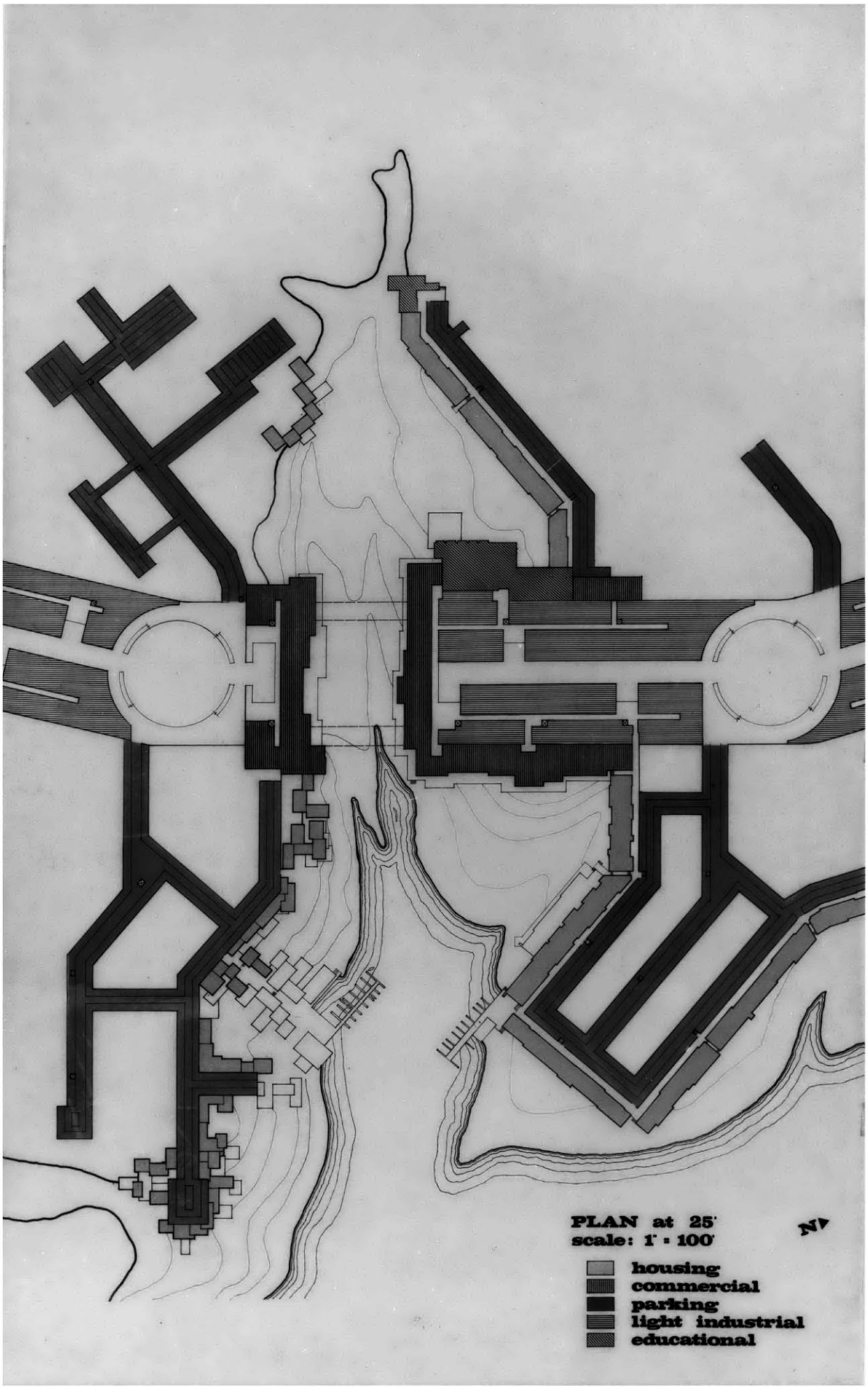
GERMANTOWN, MD.

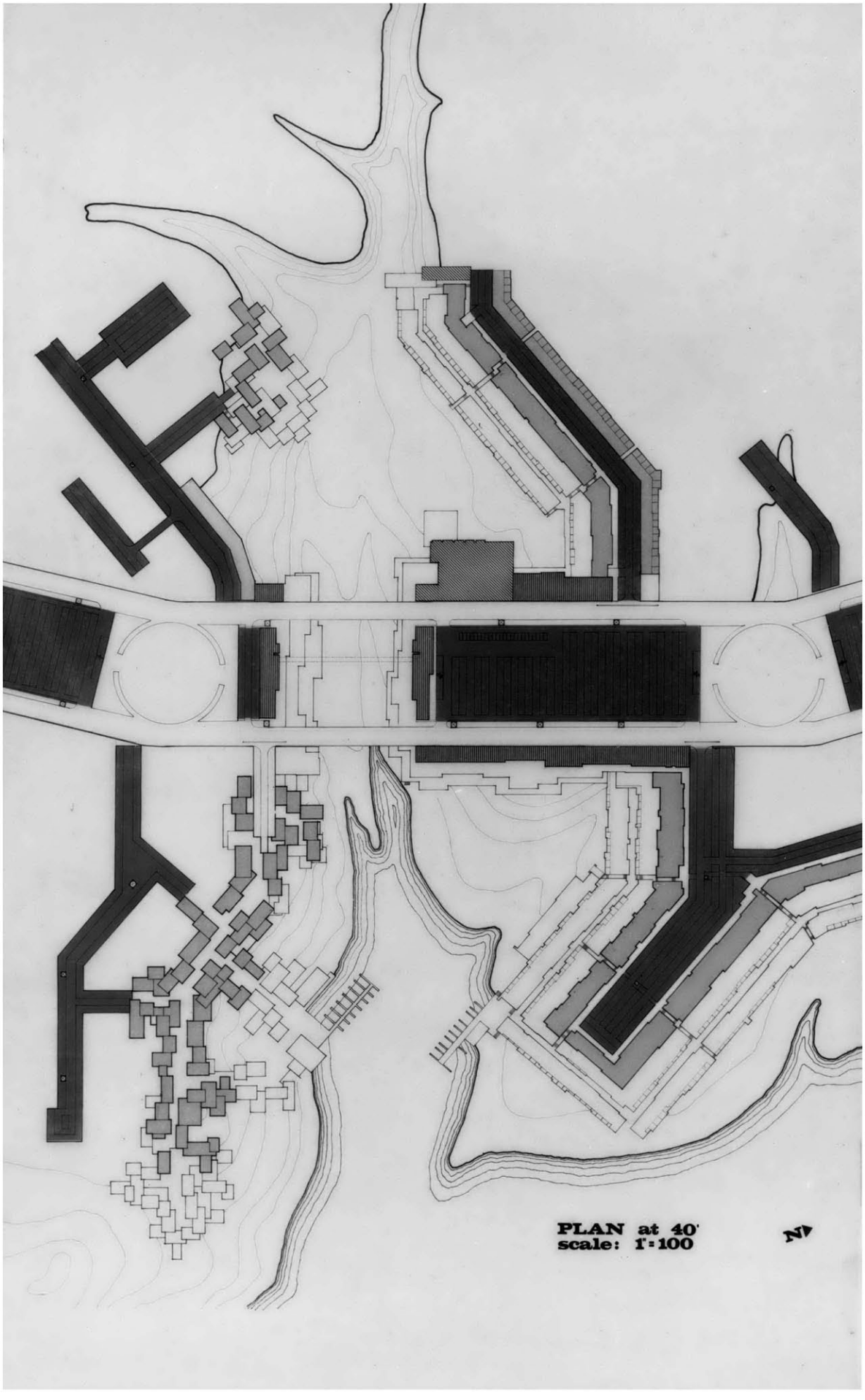


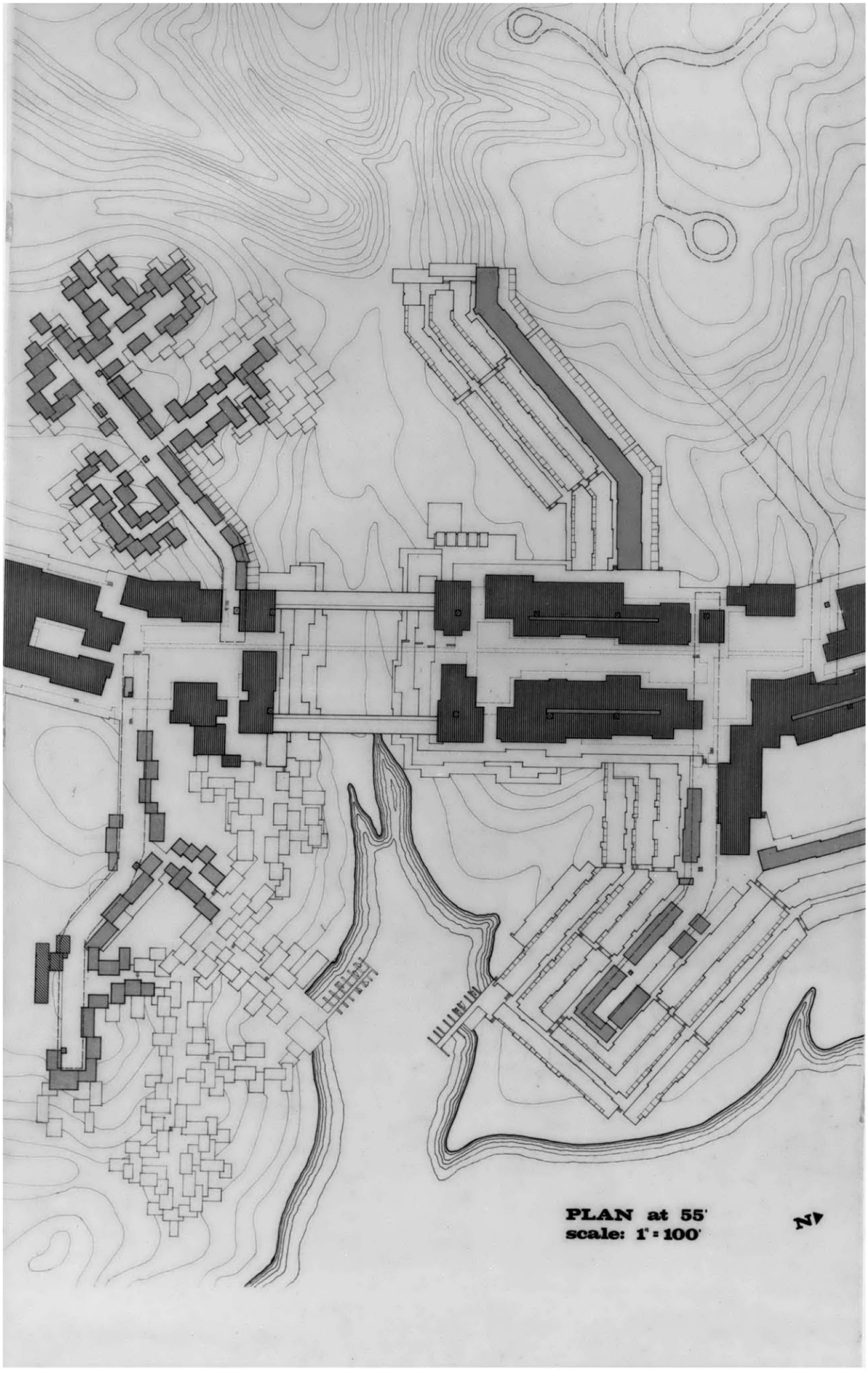
SITE PLAN
scale: 1" - 500'

N

MASTER'S THESIS
MIT JUNE, 1967
STANLEY ANDERSON


PLAN at 25'
scale: 1" = 100'
N
housing
commercial
parking
light industrial
educational


PLAN at 40'
scale: 1'=100
N


PLAN at 55'
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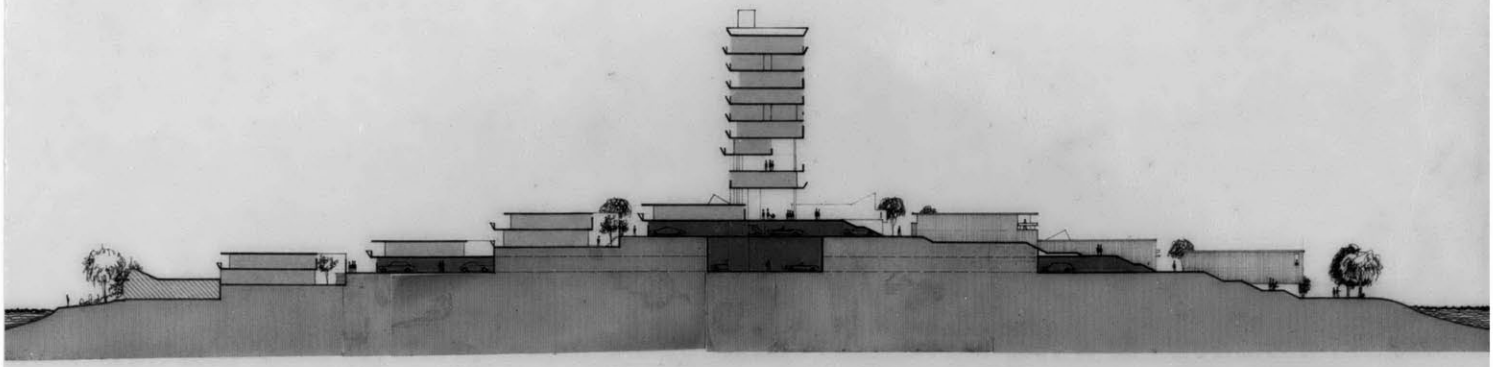
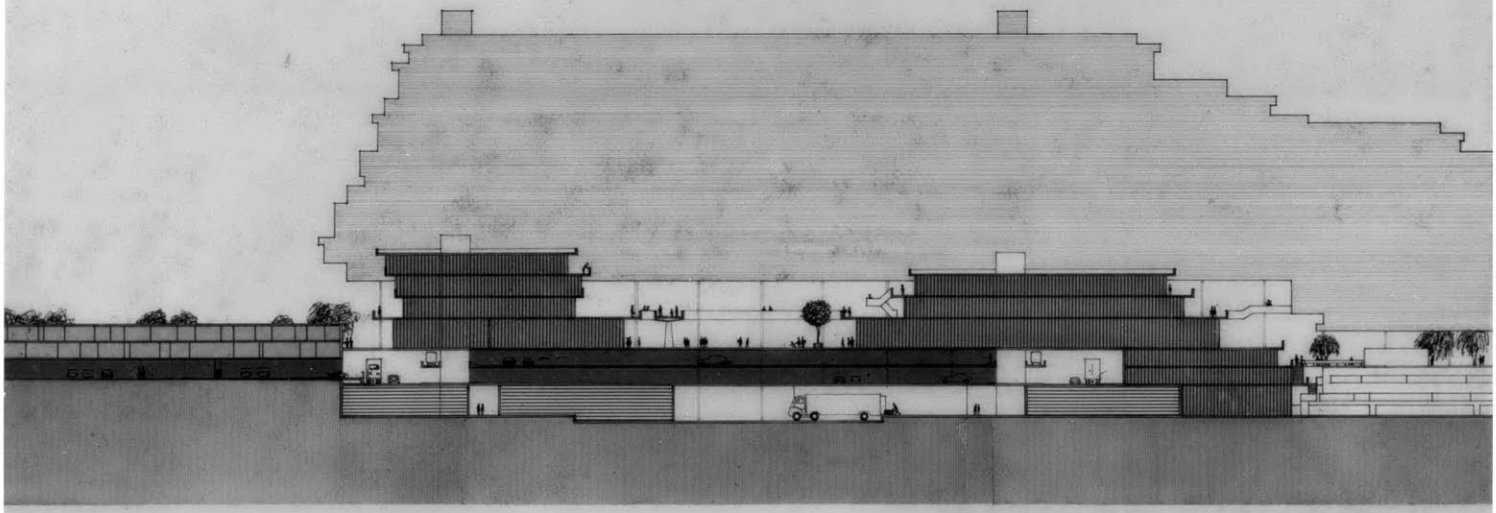
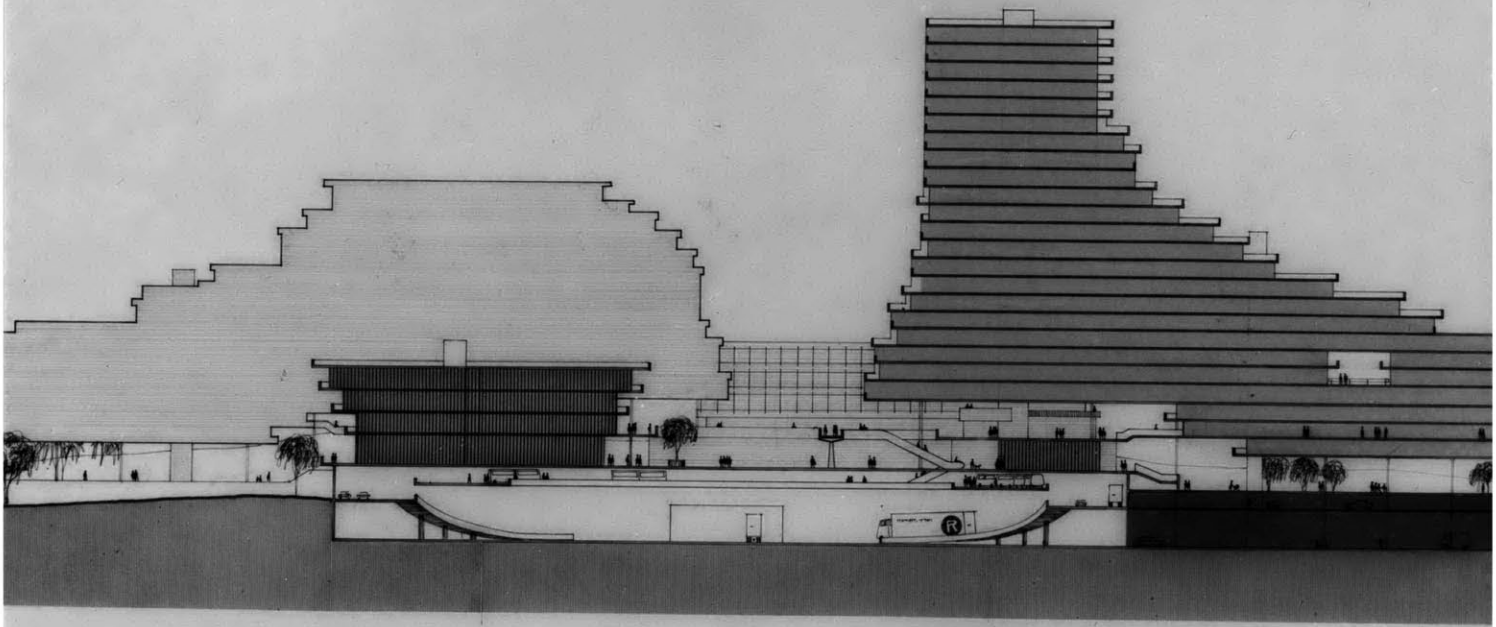


1 SECTION OF HOUSING



2 SECTION OF SPINE



3 SECTION AT NODAL POINT